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C. R. RIOLO

3,342,339

OIL FILTERS

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FIG. 1

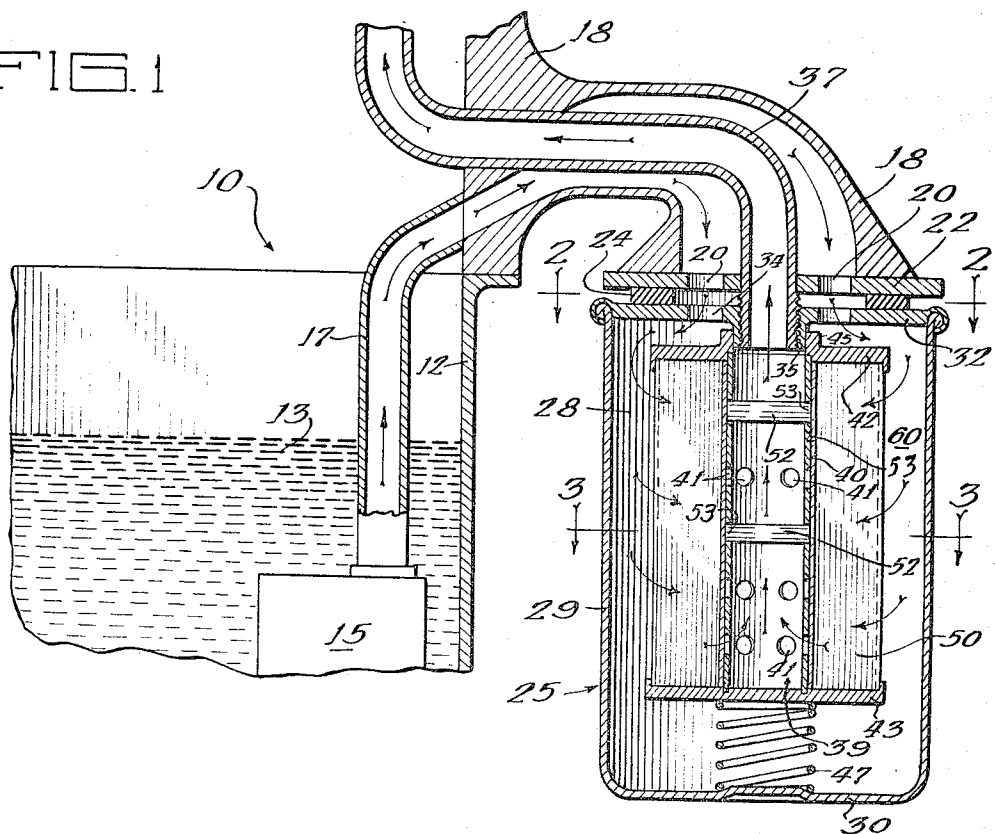


FIG. 2

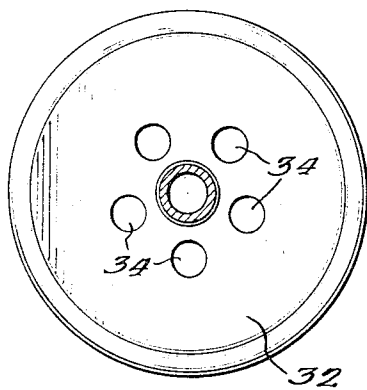
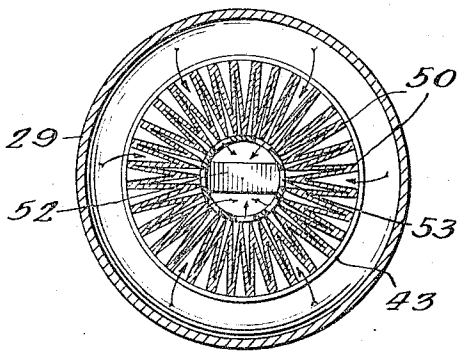


FIG. 3



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3,342,339

OIL FILTERS

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2 Claims. (Cl. 210—223)

This invention relates to oil filters and more particularly to an oil filter that will inhibit the flow of iron particles therethrough.

In oil filters the contaminated oil, from the sump, carrying abrasion causing materials such as iron particles, is pumped from the sump in the bottom of the crank case, passes through a filter element and recirculates through the engine. The purpose of the filter element is to remove impurities from the oil and thus reduce wear on the engine parts. As the oil filter becomes clogged and wears out, leaks in the filter element are apt to develop and permit particles of iron to pass through the filter and recirculate to the engine where they might cause undue wear to the moving parts of the engine.

It is an object of the present invention to reduce the amount of iron based sediment in the filtered oil returning to the crank case.

Another object is to prevent excess wear on movable engine parts.

Further objects will become apparent upon considering the following specification, which, when taken in conjunction with the accompanying drawings illustrates a preferred form of the present invention.

In the drawings:

FIG. 1 is a vertical cross-sectional view of the oil filter comprising the present invention, the filter being attached to the crank case of the engine;

FIG. 2 is a horizontal cross-sectional view taken on the line 2—2 of FIG. 1, looking the direction of the arrows; and

FIG. 3 is a cross-section taken on the line 3—3 of FIG. 1, looking in the direction of the arrows.

Referring to the drawings and particularly to FIG. 1, the engine crank case 10, has an oil sump 12, which collects oil 13 for delivery to an oil pump 15. The pump 15 receives oil from the oil sump 12 and delivers it under pressure through a pipe line 17 and into a fitting 18 formed on the exterior of the crank case 10.

The oil flows through the fitting as indicated by the flow arrows and through a plurality of apertures 20 in a face plate 22. The apertures 20 deliver the oil from the pump under pressure past a gasket 24 into the top of an oil filter, generally designated 25, to be described in detail below.

The oil filter comprises a cylindrical container 28 having side walls 29 closed by a bottom member 30, integrally formed on the lower ends of the side walls 29. A top piece 32, perforated by apertures 34, is secured to the upper edge of the container by rolling so as to leave an entrance to the container through the apertures 34. The center of the top piece 32 has an interiorly threaded nipple 35 which projects into the container and serves to engage threads on the discharge pipe 37 in the fitting 18 to return the filtered oil to the crank case 10.

The oil filtering element is built on a reel 39 comprising a cylindrical hub 40 having a plurality of apertures 41 therethrough and a pair of circular discs 42—43 forming the two ends of the reel 39. The upper disc 42 is provided with an upstanding collar 45 about the discharge opening in the reel 39, the collar being received in tight frictional engagement over the depending nipple 35 and

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retained in engagement by a compression spring 47 in the bottom of the container 28 to form a liquid tight joint.

The filtering element, which is best seen in FIG. 3, comprises a continuous series of filter paper pleats 50 having their opposite ends secured together by gluing, or the like, the pleats being formed about the hub 40 and within the outer periphery of the discs 42—43. The filter paper pleats are secured to the outer surface of the multi-perforated hub 40 and to the inner sides of the discs 42 and 43 by an adhesive to prevent the leakage of oil thereabout.

The interior of the hub 40 is provided with one or more aluminum-nickel-cobalt alloy magnets 52, known commercially as Alnico. The magnets are mounted within the hub 40 between opposite apertures 41 therein, to intercept, separate and hold any iron or steel particles passed by the filter paper pleats 50 and thus remove such particles from the oil stream returning to the crank case. The magnets are provided with reduced extensions 53 which engage in the apertures 41 to properly position the magnets.

OPERATION

Oil in the crank case 10, after lubricating moving parts, accumulates in the oil sump 12, where it enters the oil pump 15 and is pumped through the pipe 17 and into the fitting 18. From there the oil flows out, under pressure, through the apertures 20 into the space 60 in the oil filter 25 on the exterior of the filtering element 50. The oil then is forced through the filter paper 50 and through the apertures 41 into the interior of the hub 40.

The oil entering the hub 40 flows over the plurality of magnets 52, which, lying transversely to the flow of the oil attract any iron or steel particles, that may have passed through the filter, to the magnets and thus remove such particles from the stream of oil returning to the engine crank case through the discharge pipe 37.

Having thus described the invention it will be realized that it is susceptible to various changes and modifications, all of which may be made without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. An oil filter of the character described, employing a generally cylindrical outer container with a filter cartridge therein arranged on a removable spool having a perforate hollow hub with the oil flow into the container, inwardly through the filter into the hub and centrally out through one end of the container, said filter having incorporated therein a permanent bar magnet extending across the hub and secured at its ends to the inside of the hub in the path of the flowing oil whereby the magnetism from said bar magnet permeates said hub circumferentially and provides a magnetic throat through which the oil passes after it is initially filtered.

2. The filter of claim 1 in which an extension on each end of the bar magnet engages a corresponding aperture in the filter hub to retain the magnet in position.

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